NON-PUBLIC?: N
ACCESSION #: 8809190315

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Maine Yankee Atomic Power Company PAGE: 1 of 3

DOCKET NUMBER: 05000309

TITLE: Plant Trip on Unit Transformer Failure
EVENT DATE: 08/13/88 LER #: 88-006-00 REPORT DATE: 09/12/88

OPERATING MODE: 7 POWER LEVEL: 098

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Ethan B. Brand, Nuclear Safety Engineer

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COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: EL COMPONENT: XFMR MANUFACTURER: G080

REPORTABLE TO NPRDS: N

CAUSE: X SYSTEM: ED COMPONENT: 0052 MANUFACTURER: G080

REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On August 13, 1988, an unscheduled reactor trip occurred on Loss of Load due to a main turbine trip. The main turbine tripped automatically due to an electrical fault in one of the unit's two output transformers.

The faulted transformer caused a momentary low voltage condition on the reserve power supply which inhibited the automatic transfer of electrical power from the station service to reserve transformers. Both emergency diesel generators started and picked up loads on the emergency buses. All buses were repowered by manually closing the reserve power circuit breakers.

An investigation determined that the reserve power circuit breakers' autoclosure relaying functioned as designed.

The root cause of the unit transformer high voltage phase to ground short is indeterminate pending further transformer inspection.

(End of Abstract)

On August 13, 1988, the plant was operating at 98% power. At 1534 an unscheduled reactor (RCT) trip occurred due to an electrical fault in one of the unit's two main output transformers (XFMR). The electrical fault in main transformer X-1A resulted in a generator primary relay (86P) trip of the main turbine (TRB). The Reactor Protective System (JC) tripped the reactor on Loss of Load.

The 115 kv reserve lines are intertied at locations remote to the plant to the 345 kv system supplied by the unit output transformers. The fault on X-1A resulted in a momentary voltage drop on the 115 kv lines supplying reserve power. Low voltage protective relaying (27) inhibited the closure of the reserve power circuit breakers (52); as a result, the automatic transfer of electric power from the station service to the reserve transformers did not occur. Both emergency diesel generators (DG) started and picked up loads on the emergency buses. With no power to the reactor coolant pumps, the core was cooled by natural circulation.

An investigation into the 115 kv low voltage condition determined that the faulted X-1A remained connected to the grid for approximately 3-1/2 cycles (58 ms) before the second of two main 345 kv breakers (KG1) opened. The fault on X1A propagated a momentary low voltage transient throughout the local 345 kv and interconnected 115 kv grid. The transient was of sufficient duration and amplitude to trip a fast acting 115 kv low voltage sensing relay in the reserve breaker autoclosing circuitry, resulting in a close inhibit condition. The investigation determined that the reserve power circuit breaker relaying functioned as designed to prevent the reserve breakers from closing when a reduced voltage condition exists on the 115 kv lines. In this case, since the condition existed only for a few cycles, offsite power was essentially available throughout the incident.

After plant stabilization and verification that the fault was cleared, the reserve power circuit breakers were manually closed and all buses repowered. One reactor coolant pump was restarted to reinstate forced circulation.

A service water (BS) pump (P) was found tripped with its overcurrent device

actuated after the emergency diesel generators repowered the emergency buses. A standby service water pump automatically started when the circuitry sensed that the preferred pump had tripped. The problem was diagnosed to be an intermittent failure of a mechanical overcurrent device in the circuit breaker (GE Model AK-25). The circuit breaker was replaced with a breaker from an out-of-service pump. Maine Yankee plans to upgrade its 480V circuit breakers with solid state tripping devices during the next refueling outage. All other plant equipment responded as expected and post trip system parameters were normal.

Accompanying the trip were a large number of computer Sequence of Events actuations. Some of the actuations were not logged by the computer as expected. The associated computer program has been modified to preclude recurrence of this problem.

An investigation into the X-1A transformer fault indicated that an inter
al
phase to ground short on the high voltage side had occurred. The root cause of the short is indeterminate pending further transformer inspection.

Maine Yankee is reviewing the low voltage protective relaying to determine if permitting autoclosure to reserve power during rapidly clearing fault transients, such as this, is desirable. This review is expected to be initiated in 1989.

An event similar to this occurred on August 31, 1978. A fault on main transformer X-1B resulted in a plant trip from 48% power. The automatic transfer to reserve power was inhibited by a similar low voltage transient. The event was not reportable under the then current requirements.

Maine Yankee
RELIABLE ELECTRICITY FOR MAINE SINCE 1972

EDISON DRIVE AUGUSTA, MAINE 04330 (207) 622-4868

September 12, 1988 10 CFR 50.73
MN-88-93 GDW-88-253

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

References: (a) License No. DPR-36 (Docket No. 50-309)

Subject: Maine Yankee Licensee Event Report 88-006-00 - Plant Trip on Unit Transformer Failure

Gentlemen:

Please find enclosed Maine Yankee Licensee Event Report 88-006-00. This report is submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(iv).
Very truly yours,

MAINE YANKEE
/s/ G. D. Whittier
G. D. Whittier, Manager
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